REMARKS

Claims 1-22 are pending in the present application. Claims 1-5, 7-8, 12-15, and 19-22 have been rejected under § 102(b) as being anticipated by Kingdon (US Patent 5,933,468). Claims 6 and 18 have been rejected under § 103 as being unpatentable over Kingdon in view of Lehtimaki (US Patent 6,125,120). Claims 9-10 and 16-17 have been rejected under § 103 as being unpatentable over Kingdon in view of Meyer et al. (US Patent 6,577,645).

In the Specification

On page 11 of the Specification, a typographical error has been corrected.

Prior Art Rejections

The Examiner has primarily used the Kingdon reference to reject the claims. Kingdon describes a technique to correct for "bit slip" in a TRAU frame, which is sometimes responsible for losing synchronization. Kingdon makes adjustments to the TRAU frame in response to a "bit slip" by either inserting 1 or 2 extra bits into the TRAU frame, or by removing 1 or 2 bits from the TRAU frame. This adjustment is made within the same frame, rather than waiting for the next frame to make adjustments. (e.g., Kingdon, Col. 2, lines 48-64 or Col. 3, lines 45-58). While Kingdon describes a technique for correcting for "bit slip" within a frame, Kingdon does not meet the limitations of the claims of the present invention (explained below).

Generally, the present invention provides techniques for quickly resynchronizing devices in an inband signaling system after synchronization is lost. As is described in the Specification, in an inband signaling system, such as that used in a TFO system, an inband signal is derived from the least significant bit (LSB) of every Mth sample of a signaling channel. The collected LSBs are concatenated to create an inband message channel which can be used by the inband signaling system. (E.g., see FIG. 2).

In the example where M = 16, there are 16 potential message channels, since, before synchronization, it is not known which LSBs contain the inband signal information. FIG. 4 is a diagram that illustrates the M possible message channels (referred to as "sample grids"), one of which is the actual inband message channel. To initially obtain synchronization, the potential message channels are each compared to a reference pattern, which should only be found in the correct message channel.

In the prior art (including Kingdon), once synchronization is accomplished, the contents of sample grids are discarded and bits are no longer collected for the other potential message channels. In contrast, the present invention continues to collect bits and fill the M sample grids, even after synchronization is achieved. With the present invention, since the sample grids will already be filled when synchronization is lost, the system can resynchronize quickly. While Kingdon provides a technique for recovering from "bit slip", Kingdon does not provide a way to quickly resynchronize when the system becomes unsynchronized due to something other than "bit slip".

Amended claim 1 recites a method of maintaining synchronization of an inband signaling system comprising including "collecting inband signaling information from samples in a signaling channel", "using the collected inband signaling information to form a plurality potential message channels", "determining which of the plurality of potential message channels relates to a desired message channel", "synchronizing the signaling system based on the collected inband signaling information", and "continuing to collect inband signaling information and using the collected inband signaling information to maintain the plurality potential message channels while the signaling system is synchronized for use in resynchronizing the signaling system when synchronization is lost."

Kingdon does not teach or suggest forming a plurality of potential message channels and maintaining the plurality of potential message channels while the system is synchronized. Kingdon teaches a technique for adjusting the TRAU frame in response to a detected "bit slip", but would require a more conventional resynchronization if the system could not recover from a "bit slip", or if the system became unsynchronized as a result of something other than merely a "bit slip". It is therefore believed that amended claim 1, and all claims depending from claim 1, are allowable over the cited prior art.

Claim 12 recites a method of facilitating tandem free operation of two devices in an inband signaling system having an inband signaling message comprised of the concatenation of the least significant bit of every Mth sample of a digital signaling channel. The method includes the step of "continuing to fill the M sample grids while the two devices are synchronized in order to maintain all of the possible sample grids to facilitate rapid resynchronization of the two devices if synchronization is lost." Kingdon does not teach or suggest filling the M samples grids while the devices are synchronized. Instead, Kingdon teaches a way of adjusting the TRAU frame in response to a detected "bit slip". It is therefore believed that claim 12, and all claims depending from claim 12, are allowable over the cited prior art.

Claim 19 recites a TFO inband signaling synchronization system including "a storage device that maintains a plurality of sample grids, wherein samples are collected from a signaling channel and are used to fill the plurality of sample grids" and "a detector that detects the presence of an inband signaling channel based on the contents of the plurality of sample grids, wherein a detected inband signaling channel is used to synchronize devices to facilitate tandem free operation, and wherein the collection of samples continues during synchronization to maintain the plurality of sample grids for facilitation of rapid resynchronization." Kingdon does not teach

a storage device as recited in claim 19, and does not teach that the collection of samples continues during synchronization to maintain the plurality of sample grids. It is therefore believed that claim 19 is allowable over the cited prior art.

Amended claim 20 recites a method of maintaining synchronization in devices in an inband signaling system including "providing a synchronization technique for synchronizing one or more devices in the inband signaling system, wherein the synchronization technique involves the collection of bits from a signaling channel and filling a plurality of sample grids with the collected bits to provide a plurality of possible sample grids", "applying the synchronization technique to the inband signaling system to synchronize the one or more devices", and "continuing to apply the synchronization technique while the one or more devices are synchronized in order to facilitate rapid resynchronization of the one or more devices if synchronization is lost." For at least the reasons set forth above, it is believed that amended claim 20, and all claims depending from claim 20, are allowable over the cited prior art.

Conclusion

It is respectfully submitted that all claims are patentable over the prior art. It is further more respectfully submitted that all other matters have been addressed and remedied and that the application is in form for allowance. Should there remain unresolved issues that require adverse action, it is respectfully requested that the Examiner telephone Bruce A. Johnson, Applicants'

Attorney at 512-301-9900 so that such issues may be resolved as expeditiously as possible.

Respectfully Submitted,

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Date

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